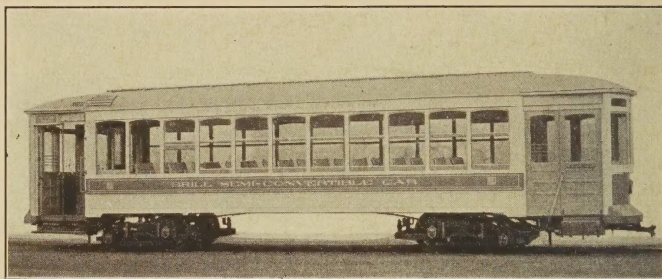


BRILL MAGAZINE





BRILL SEMI-CONVERTIBLE CARS

The number of semi-convertible cars going through the shops is significant. For the first five weeks of this year, out of the 743 cars building, 388, or $52\frac{1}{5}$ per cent, are semi-convertible. Large as this is, it is much lower than usual, but the full year's record will show up something like the past two years—87 per cent in 1911 and $79\frac{1}{8}$ per cent in 1912. The reason for the predominance of Brill Semi-Convertibles is their complete adaptability to any temperature and the consequent saving of large capital investments in summer cars. Another reason is that the public everywhere favors the car. While the name "Semi-Convertible" is unknown to railway patrons, they do know and appreciate abundant light, and on warm days, the large, airy, window-free space beside them, with a good breeze and an open view, and with sashes in roof pockets that can be drawn down instantly in a sudden storm or if the nights are cool. That the Brill Semi-Convertible Car has had the largest use of any type for the last ten years, is a fact worth knowing and worth remembering.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA



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Frank Hedley

VICE-PRESIDENT AND GENERAL MANAGER, INTERBOROUGH RAPID TRANSIT COMPANY

BRILL MAGAZINE

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VOL. VII

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No. 2

FRANK HEDLEY

[WITH PORTRAIT INSERT]

FRANK HEDLEY, vice-president and general manager of the Interborough Rapid Transit Company, New York, was born at Maidstone, Kent, England, in 1864. His father, James Hedley, was master mechanic of the Southeastern Railway, and his great-granduncle, William Hedley, designed and built the original locomotive traction engine in 1813, from which Stephenson obtained his ideas for his first locomotive, built in 1825. Mr. Hedley received a common-school education and learned the trade of machinist at Maidstone. He came to this country in 1882, and the first two years was a machinist in the Jersey City shops of the Erie Railroad, following which he was employed in the same capacity in New York Central shops for a few months. He next went as machinist with the Manhattan Elevated Railway, and in 1885, after promotion from one post to another, became assistant general foreman in the locomotive department. In 1889 he was appointed master mechanic of the Kings County Elevated Railroad, Brooklyn, resigning in 1893 to become general superintendent of motive power and rolling stock for the Lake Street Elevated Railroad, Chicago, and, a few months later, general superintendent. This was the first elevated railway to discard locomotives and use electric motors. Less than two years after going to Chicago he was appointed consulting engineer by the late Charles T. Yerkes, in addition to the duties of the other offices, and retained this position throughout the construction of the Northwestern Elevated and Chicago Union Loop. He organized the operating forces of these three elevated systems, and had charge of their operation as general superintendent. In January, 1903, he was appointed general superintendent of the Interborough Rapid Transit Company, New York, and the following year became general manager. On July 1st, 1908, he was elected vice-president and general manager, being responsible for the operation of all elevated and subway lines in the boroughs of Manhattan and Bronx, and partly in Brooklyn. He is also vice-president and general manager of the New York Railways Company, operating surface lines in New York; vice-president of the Subway Construction Company, and manager for the trustees of the New York & Long Island Railroad. His subway, elevated and surface systems were carrying, at the end of 1912, upwards of 3,000,000 fare passengers per day. Mr. Hedley is a member of the Engineer's Club, the Western Railroad Club, and has served as president of the New York Railroad Club.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

MEMPHIS, TENN.*

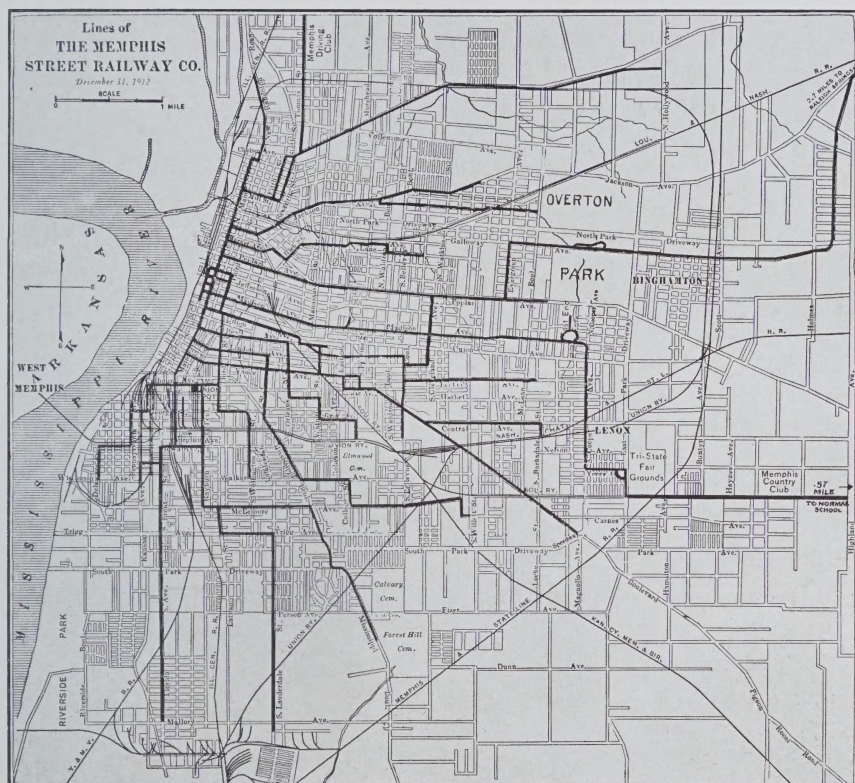
MEMPHIS, the chief commercial city of Tennessee and the largest city on the Mississippi River between St. Louis and New Orleans, is situated in the southwestern corner of the state, on Chickasaw Bluffs, a comparatively high plateau on the east side of the river, originally inhabited by Indian tribes of that name.

The head of deep water navigation on the Mississippi is at Memphis, and this, with its peculiarly metropolitan location,



MEMPHIS TRAFFIC CONDITIONS AND CARS. Main Street and Madison Avenue, heaviest traffic point on system. In morning and evening rush hours cars pass every $18\frac{1}{2}$ and $15\frac{1}{2}$ seconds respectively

* The fiftieth article of this series.



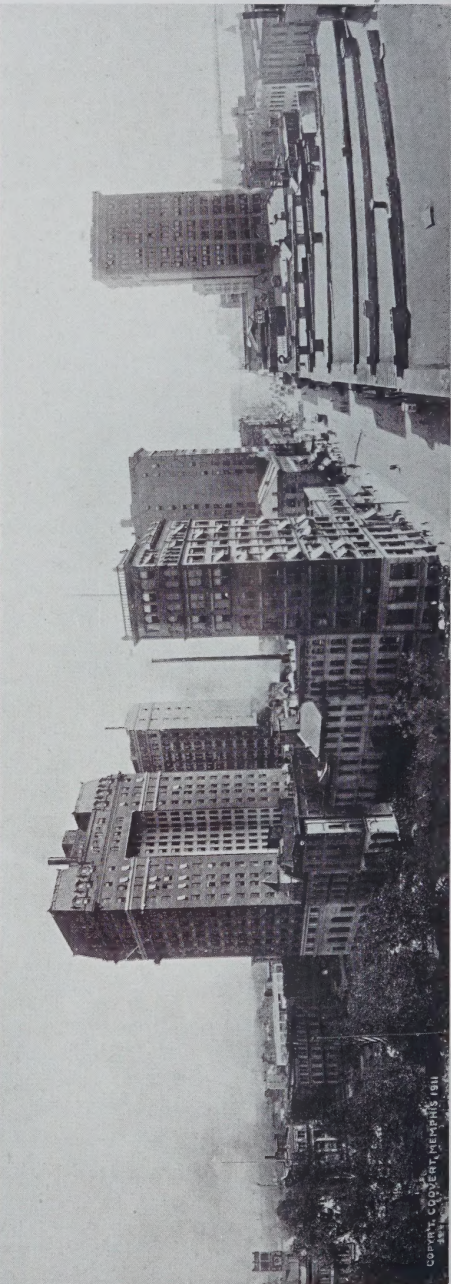
MEMPHIS TRAFFIC CONDITIONS AND CARS. Main Street is the only north and south thoroughfare connecting all trolley lines. Two-car trains loop on adjacent streets to relieve congestion

assures its development to large future proportions. The surrounding country, which is rich in cotton and rice and generally adapted to agriculture, naturally turned to Memphis for its market because of the city's accessibility. Its development was rapid after 1880—during the preceding ten years an almost continuous yellow fever epidemic robbed it of two-thirds its population; in 1900, the population was 102,220 and in 1910 there were 131,105 inhabitants.

From its early history, Memphis has been active in southern commerce and industry and developed its principal trade in cotton, lumber, groceries, mules and horses, and its leading manufactures, which, in 1900, had a factory value of

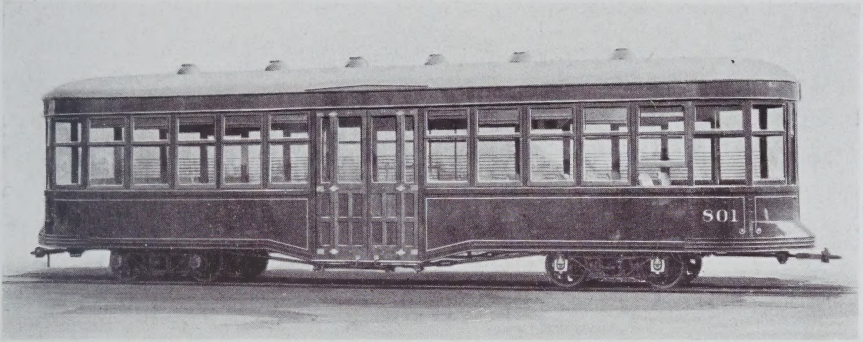


COPYRIGHT, MEMPHIS 1907



COPYRIGHT, MEMPHIS 1911

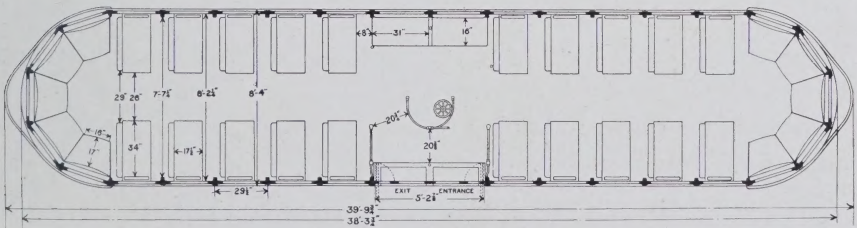
MEMPHIS TRAFFIC CONDITIONS AND CARS. The upper photograph shows a part of the waterfront and the general elevation of city above the Mississippi River. The lower view shows the character of the business section and is overlooking Main Street, which parallels the waterfront and bears all north and south traffic



MEMPHIS TRAFFIC CONDITIONS AND CARS. Trail cars have steel bottom-frame with truss reinforcements under center entrance. Special Brill No. 53-D arch-bar trucks, 24-in. wheels, to reduce step height. Steel sides to belt rail, wooden upper frame; posts set in malleable pockets

\$14,233,483 and \$21,346,817 in 1905, include cottonseed oil and cake, lumber, flour and grist-milling, confectionery, carriages and wagons, paints, furniture, bricks and tobacco goods. The extensive repair shops of the Illinois Central and St. Louis & San Francisco Railroads, of course, add immensely to the factory value, but are not recognized as affecting the city's productive importance. Its large annual freight shipments and receipts are handled through the terminal stations of the Chicago, Rock Island & Pacific; St. Louis & San Francisco; Illinois Central; Southern; Louisville & Nashville; Nashville, Chattanooga & St. Louis; St. Louis, Iron Mountain & Southern; St. Louis Southwestern, and Yazoo & Mississippi Valley Railroads, and many Mississippi steamboat lines.

Memphis is generally level, and the streets, for the greater part, broad and well shaded and laid out with comparative



MEMPHIS TRAFFIC CONDITIONS AND CARS. Ten Brill stationary-back cross seats in each end, 40 passengers; two semi-circular seats in vestibules, 10; longitudinal seats behind conductor's station, 4; total, 54. Forward half of doorway is for entrance and rear half for exit



MEMPHIS TRAFFIC CONDITIONS AND CARS. Side sills offset 9 in. to bring step within car side. Double-leaf folding doors operated through lever in pipe railing at conductor's station. Pipe stanchion divides entrance and exit—no railings used for that purpose. Truss rod passes under step-risers, stiffening entire structure

orderliness. The business section is mostly within the confines of a long, narrow quadrilateral along the river front and extends back about three-quarters of a mile. The residential districts cover the north-eastern, eastern and southern sections and adjacent suburbs. From Court Square, in the heart of the city, a system of boulevards, $11\frac{1}{2}$ miles long, connects several fine parks which aggregate more

than 1000 acres. The entire city is modern and every undertaking is conducted along comprehensive lines.

All the street railways in the city are operated by the Memphis Street Railway Company. The plan of the several lines can hardly be termed radial, as all car lines are not focused upon a single point, although this is true of some; however, the objective point of each line is at some part of the elongated business section, in which only Main Street bears tracks through the entire length. All parts of the city are well provided with street railway service, and, even in the most remote districts, car lines average not more than three-quarters

of a mile to a mile apart. The fact that Main Street forms the only north and south link connecting all the lines in the city naturally produces a comparatively dense traffic on that thoroughfare, to overcome which, as well as for reasons of efficiency and economy, trailer operation was adopted several years ago and has demonstrated its usefulness in quicker transit. In general the grades are not sufficiently severe to affect trailer operation, although on some lines $4\frac{1}{5}$ per cent grades are encountered. These are short, however, and do not demand excessive tractive effort in the motor cars.

The majority of the lines in Memphis are longer than is usual in cities of its size, because the business section is on the extreme west side of the city, along the river front. The average length of line is about 5.32 miles, and the shortest, 1.56 miles; the longest entirely within the city limits is about 5.39 miles, measured from the center of the business section of



MEMPHIS TRAFFIC CONDITIONS AND CARS. Round vestibule and semi-parabolic bumper increase clearance at curves. Under truss on side shown, held by queen posts; on entrance side, by step risers. Exterior sheathing, 12-gage "patent level steel"

the city at Main Street and Madison Avenue. The two longest lines are the East End line, which, in the eight miles of its length, passes through East End Park, Lenox and the Tri-State Fair Grounds, and the Raleigh Springs line, 11 miles long, which follows a general northeasterly direction through Overton Park and Binghamton, Tenn., to its



MEMPHIS TRAFFIC CONDITIONS AND CARS. Conductor stands within semi-circular pipe railing. Longitudinal seat for four passengers behind him. Lower window sashes raise their full height into roof pockets. Upper sashes stationary

terminal at Raleigh Springs, to which point an additional fare is charged. It was formerly the practice to move cars of these two heavy traffic lines along Main Street, but with the installation of loops and wyes at the terminals, and the introduction of single-end operation, two other streets, parallel to Main Street, have been adapted to looping, thus relieving the principal artery of traffic of an appreciable portion of its burden. With the further development of the loop system, Main Street will be gradually relieved of more lines, till the congested

condition, which existed up to a short time ago, is eliminated.

The service on the two long lines mentioned above is particularly heavy during the summer months. On the East End line, some of the trains are turned back at the Tri-State Fair Grounds, and others continue to the terminal at the State Normal School. In summer, when park business warrants, a special train service is operated to East End Park—a popular amusement resort. The Raleigh Springs line, which also loops around several streets in the business section, is provided with loops at Overton Park and Raleigh Springs. Summer traffic to and from Overton Park is high, and demands the greatest efficiency in car service.

The concentration of business within a comparatively small area causes a heavy morning influx and evening exodus of business people. During the rush hours, from 7.15 to 8.15 a. m. and 5.30 to 6.30 p. m., with the morning peak at 7.30 and the evening peak at 6 o'clock, the proportions of the traffic may be realized when it is considered 195 morning and 236 evening cars, of which 11 are morning and 19 evening trailers, pass Main Street and Madison Avenue, the heaviest traffic point on the system, each hour, or at intervals of $18\frac{1}{2}$ seconds between cars in the morning and $15\frac{1}{5}$ seconds at night. For the operation of the system during these periods 200 cars are required, while 98 cars suffice for normal daily operation. There are, however, 297 cars available for unusually heavy traffic movements, of which 262 are motor cars and 35 are trailers. The total mileage of the Memphis Street Railway is 124.74, reduced to single track, of which there are 49.19 miles of double track and 26.36 in car-houses, crossovers, sidings and other track. During the fiscal year ending December 31, 1912, this traffic produced 7,377,486 passenger car miles, with 38,460,595 revenue and 9,237,483 transfer passengers, representing a traffic density of 6.46 revenue passengers per car mile.

The rapid growth of the city and the consequent demand for a constantly improving car service led to the adoption of

trailers in 1905. The car equipment consisted mainly of a variety of single-truck closed and open motor cars and additional open trail cars. The motor cars, which were built at the John Stephenson plant of The J. G. Brill Company in 1905, are of the Brill semi-convertible type, seating 44 persons on 14 transverse and four corner longitudinal seats. The bottom frames are entirely of wood, and have been reinforced to withstand the strains incident to trailer operation. The platforms, which were originally fitted with wire gates, now have folding doors, and since the adoption of single-end operation on the two long lines the rear bulkheads have been replaced by pipe stanchions. With the continued increase in passengers, a new form of trailer with increased seating capacity, rapid means of entrance and exit, and at the same time of light weight, became a necessity, especially on the East End and Raleigh Springs lines. Fifteen trail cars of a new type were therefore recently furnished by The J. G. Brill Company, and have been made the standard cars of this class. They are mounted on specially designed Brill No. 53-D arch-bar trail trucks, with



MEMPHIS TRAFFIC CONDITIONS AND CARS. Motor cars have wood bottom frames; Brill No. 27-GE1 trucks. Single-end operation



MEMPHIS TRAFFIC CONDITIONS AND CARS. Motor cars seat 44 passengers. Bulkheads originally used were replaced by pipe stanchions. Brill semi-convertible window system

24-in. wheels, to bring the floor of the car $28\frac{5}{8}$ in. over the rail head. The cars are provided with a center entrance and the bottom frames, which are entirely of steel, have the right side sill arranged with an offset, turning the sill 9 in. nearer the center line of the car, at the center entrance, to keep the step within the car side. The two side sills are 7-in. I-beams and the four crossings and two end sills, exclusive of the body bolsters, are 4-in. I-beams. A one-piece semi-circular 7-in. I-beam extends around each end from the corner post on one side to that on the other, and an anti-climbing device is affixed to a casting riveted to the I-beam. Two 4-in. I-beam stringers extend from the intermediate crossings to the end sills and pass between the top and bottom members of the steel plate body bolsters. Strong diagonal braces are provided near the ends and on either side of the center entrance to evenly dis-

tribute strains incident to hauling. Two $1\frac{1}{2}$ -in. truss rods, affixed to the under sides of the side sills at the body bolsters, reinforce the bottom frame against horizontal deflection. The rod on the left side is spaced from the sill with the usual queen posts, but that on the right, or entrance, side is passed under the step brackets. The support thus given the bottom frame at the opening is much increased over older methods, as the step itself stiffens the bottom framing by its box form. At one end of the frame a double-acting coil-spring draft gear is applied between the two I-beam stringers, to absorb the buffing and hauling shocks that always accompany trailer operation, and a rigid draw bar for emergencies is provided at the other end.

Malleable iron pockets are riveted to the outer surfaces of side sills and hold the long-leaf yellow pine side and corner posts. The sides are straight and sheathed with white ash and an exterior sheathing of 12-gage "patent level steel" below the windows. The lower and top window rails are made in one piece and are screwed and dovetailed to the posts to insure rigidity and compensate for the lack of side framing at the center entrance.

Large double sash windows, with the upper stationary and the lower sashes arranged to raise into recesses in the roof, till level with the upper, make the cars equally suitable for summer and winter service. The center entrance, which is 5 ft. $2\frac{7}{8}$ in. wide, is divided by a pipe stanchion, the forward half of the opening being restricted to boarding and the other to alighting. The conductor's position is in the center of the car, behind a semicircular pipe railing, in the middle upright of which is his control handle for operating the two double-leaf folding doors. A very simple lever arrangement, devised by the railway company, makes the door control simple and easy. A brake wheel, connected with the air-brake system, is also at the conductor's station, for emergencies. The seating arrangement, which provides accommodations for 54 passengers, is shown in the diagram on page 37.

MORE SEMI-CONVERTIBLE CARS FOR THE NORTHERN OHIO TRACTION & LIGHT COMPANY

BRILL No. 27-F1 TRUCKS

THE Northern Ohio Traction & Light Company, Akron, Ohio, recently placed in service, on its city lines in Akron, 17 additional Brill semi-convertible cars, built by the G. C. Kuhlman Car Company.

The lines of the Northern Ohio Traction & Light Company extend from Cleveland to Uhrichsville, Ohio, passing through Cuyahoga Falls, Akron, Canton, Massillon, New Philadelphia, and a number of other populous centers. Branch lines run from Cuyahoga Falls to Silver Lake and Ravenna; from Akron to Barberton and Wadsworth and from Massillon to East Greenville. The system has a total trackage of 215.76 miles, 4 ft. 8½-in. gage, and operates 384 interurban and city cars. This mileage includes the city lines in Akron, Canton and Massillon. Large crowds are transported in summer to pleasure resorts at Lakeside Park, near Akron, Meyer Lake, near Canton, and Silver Lake Park, near Cuyahoga Falls,



CARS FOR AKRON. Open rear platform, dasher extends to body on far side. Front platform vestibuled; two-leaf folding door operated manually by motorman. Brill No. 27-F1 trucks

necessitating the operation of many special cars. A fast local and limited car service is maintained between Cleveland and Canton. In the former city there are 560,663 inhabitants and 50,217 in the latter, with 69,067 in Akron and 13,879 in Massillon, or a total population between 750,000 to 800,000, tributary to the system.



CARS FOR AKRON. Rear entrance door off center to provide for toilet later. Seating capacity, 44.
Brill semi-convertible window system

In Akron, where the company operates its largest city system, both Brill semi-convertible and half-convertible cars, which have the full convertible feature on one side and ordinary drop sashes on the other, have been used for many years. The 17 new semi-convertible cars are arranged for single-end operation and have the front platform enclosed in a vestibule having a two-leaf folding exit door, operated through levers, by the motorman. The rear platform is open and has but one step, the dasher extending around to the body. Station-

ary steps, $16\frac{1}{16}$ in. above the rail head, are used at both ends. The front bulkhead has a sliding center door, $40\frac{1}{2}$ in. wide, and the rear bulkhead has a sliding door, 36 in. wide, placed 6 in. nearer the entrance than the far side, to allow the substitution of a toilet, if desirable, for the two-passenger longitudinal seat in that corner. Two-passenger longitudinal seats are in the other corners, and with 18 stationary transverse seats give a total seating capacity of 44 persons. Ventilation and light are provided by pivotal deck sashes and the Brill semi-convertible window system, and a suitable temperature is maintained in winter by a forced-draft hot-air heater located on the motorman's platform.

The bottom framing consists of 4 by $7\frac{3}{4}$ -in. yellow pine side sills, plated with $\frac{3}{8}$ by 15-in. steel; $5\frac{1}{4}$ by $6\frac{7}{8}$ -in. oak end sills; $3\frac{1}{2}$ by $4\frac{1}{2}$ -in. center longitudinal stringers; $3\frac{1}{2}$ by $4\frac{1}{2}$ -in. oak crossings and $4\frac{3}{4}$ by $1\frac{3}{4}$ -in. oak diagonal braces, near the center of the framing, to take up braking strains. The platforms are supported on Brill truss knees and angles, which are bolted to the center stringers and extend 4 ft. 9 in. back of the centers of the body bolsters. The entire bottom framing is well reinforced with transverse truss rods. The upper framing is a good example of standard practice, with ash side and corner posts mortised and tenoned into the side sills. The cars, being mounted on Brill No. 27-F1 trucks, with 4 ft. wheel base, are equally suitable for city service or for suburban runs where speeds are not over 30 miles per hour.

Length over corner posts . . .	30 ft. 8 in.	Track to step	$16\frac{1}{16}$ in.
Length over platforms . . .	39 ft. $10\frac{1}{2}$ in.	Step to platform	$14\frac{1}{2}$ in.
Length of front platform . . .	4 ft. $2\frac{1}{2}$ in.	Platform to floor	9 in.
Length of rear platform . . .	5 ft. 0 in.	Seating capacity	44
Centers of side posts . . .	2 ft. 8 in.	Type of trucks	Brill No. 27-F1
Width over sills	8 ft. $0\frac{1}{2}$ in.	Wheel base	4 ft. 0 in.
Width over posts	8 ft. 4 in.	Diameter of wheels	33 in.
From track to side sills . . .	2 ft. $8\frac{11}{16}$ in.	Type of motors	West. 101B2—4-50 hp.
From side sills over trolley boards	9 ft. 4 in.	Wt. of complete carbody . . .	20,620 lb.
From floor to center of head- lining	8 ft. 5 in.	Weight of trucks	13,200 lb.
		Weight of motors	11,800 lb.
		Total weight	45,620 lb.

PASSENGER AND BAGGAGE CARS FOR NASHVILLE-GALLATIN INTERURBAN RAILWAY

INITIAL EQUIPMENT

THE American Car Company recently built four interesting passenger cars and one baggage car—the initial equipment—for the new 1200-volt high-speed Nashville-Gallatin Interurban Railway. The cars are equipped with M.C.B. automatic couplers to enable equipment interchange with steam railroads. The new road is 24 miles long and runs from Nashville to Gallatin, Tenn., passing through Ekin, Edgefield, Hendersonville, Avondale and populous intervening sections. The main highway from Nashville to Gallatin is followed most of the way, and for the first few miles out of Nashville the tracks of the Louisville & Nashville Railroad are practically paralleled. Both passengers and freight will be transported, and the fact that the new road is the only electric line between the two cities presages a large volume of traffic. It is expected that much of the local business now being handled by the Louisville & Nashville Railroad will be diverted to the new road. It is the purpose of the company to extend its lines, at some later date, to Frankfort and Bowling Green, Ky., and ultimately to Louisville, which would create an interurban route between Nashville and Louisville and bring a large territory into direct connection with the interurban systems of Ohio, Indiana and Illinois.

The equipment of the Nashville-Gallatin line is of a high character throughout. The track, in which 70-lb. rails are used, is excellent, resting on a clean gravel ballast; the alignment, with no curve exceeding six degrees; the profile, showing a maximum grade of three per cent.; carefully designed overhead construction and sub-stations, and excellent rolling



CARS FOR NASHVILLE-GALLATIN. For new 1200-volt line. Composite bottom frame: long front platform to accommodate baggage and two passengers on folding seats. Brill No. 27-M.C.B.1 trucks. Baggage cars have same general characteristics but are 4 ft. 4 in. shorter

stock, point to economical operation. It is interesting to note that no steam locomotives were used in the construction of the road. After grading had been completed, the overhead structure was erected and energized, and an electric car, running on rails just laid, did the work ordinarily done by steam.

Hendersonville, about half the distance between the terminals, has been made a division headquarters, and a repair shop, freight and passenger station, office building and sub-station are located there. Power for operation of the road is hydro-electrically generated on the Ocoee River; it is transmitted 180 miles to Nashville at 120,000 volts a.c., and from Nashville to Hendersonville at 33,000 volts a.c., where it is transformed into trolley current at 1200 volts d.c.

The four passenger cars are equipped for single-end operation and are mounted on Brill No. 27-M.C.B.1 trucks capable of a speed of 50 miles an hour. The underframes are of composite construction and have $4\frac{1}{2}$ by $7\frac{3}{4}$ -in. yellow pine side sills, reinforced their full length on the inside with $\frac{3}{8}$ by 15-in. steel plate and $3\frac{1}{2}$ by $\frac{3}{8}$ by 6 in. angles at the body bolsters; $4\frac{1}{2}$ by 7-in. center and intermediate stringers, the latter reinforced with $3\frac{1}{2}$ by $\frac{3}{8}$ by 6-in. angles from the crown pieces to the body bolsters; $4\frac{1}{2}$ by 7-in. oak end sills, protected by $\frac{1}{2}$ by 6-in. steel plates, bent around the sills in channel

form, and $3\frac{1}{2}$ by 6-in. oak crossings, reinforced with iron tie rods and secured to the side sills with malleable iron pockets. Under trusses, between the bolsters and upper trusses, anchored under the side sills at the body corner posts, assist in precluding horizontal deflection.

The body corner posts are $3\frac{1}{2}$ in. thick and the side posts alternately $2\frac{1}{4}$ and 3 in. thick; the double-sash twin windows have a single arch-top upper sash, set with ornamental frosted glass; the lower sashes raise their full height. The front platform is 6 ft. 3 in. long and has a two-leaf folding door and triple-tread steam coach step on the right and a 42-in. sliding door on the left.

The purpose of so long a front platform in an inter-urban car is to provide space for light baggage and express matter. Folding seats are hinged to the left side of the bulk-head. The smoking compartment, which is separated from the main compartment by a wood partition with 22-in. swinging door, occupies the space of two windows, and accommodates 16 passengers.

The main pas-



CARS FOR NASHVILLE-GALLATIN. M.C.B. automatic couplers for interchange with steam roads; headlight on hood. Outside vestibule sashes drop; center sash stationary



CARS FOR NASHVILLE-GALLATIN. Lower sashes raise full height. Smoking compartment accommodates 16 on transverse seats; main compartment, 36; total, 54, including folding platform seats. Toilet in left rear corner

senger compartment provides for 36 passengers on 14 Brill "Winner" reversible and three stationary-back transverse seats, and one longitudinal seat in the right rear corner; total seating capacity of the entire car is 54. In the left rear corner is a toilet-room with zinc-covered floor; an oval window, with leaded opalescent glass, and an exhaust ventilator in the ceiling, furnish light and air. Between the toilet-room and the first seat is a cabinet containing a forced-draft hot-air heater. The interior finish throughout is in cherry, stained mahogany, and decorated composition headlining. The rear platform has also a two-leaf folding door and triple-tread steam coach step on the right side; on the other side and in the vestibule there are four windows, that on the side arranged with stationary upper sash and drop sash below; the three vestibule sashes are made to drop.

The baggage car is arranged for double-end service and is mounted on Brill No. 27-M.C.B.1 trucks, like the passenger cars; the composite bottom frame is practically the same, except that the side sills are $5\frac{3}{4}$ by $7\frac{7}{8}$ in., reinforced their full length with $\frac{5}{8}$ by 7-in. steel plate, and the crossings, $3\frac{3}{4}$ by $5\frac{7}{8}$ in. and $4\frac{1}{2}$ by $5\frac{1}{2}$ in. The sides have two windows, with stationary sashes, a 7-ft. sliding baggage door and a sliding door, 39 in. wide, at diagonally opposite corners; the body is separated from the two platforms by solid bulkheads, in each of which is a solid wooden sliding door. For the more expeditious handling of heavy shipments, an air hoist with 800 pounds lifting capacity is placed on one side of each baggage door. This consists of two channels with the ends centered in pivot castings, and with an air cylinder having a piston stroke of 2 ft. 6 in. A boom, that may be swung out of the door, is attached to the upper end, and by means of a cable running over sheaves, the downward movement of the piston effects the lift. The exterior of the car is sheathed in tongued and grooved poplar boards.

The principal dimensions of the four passenger cars are:

Length over corner posts	38 ft. 0 in.	From side sills over trolley boards	9 ft. 2 in.
Length over platforms	49 ft. 4 in.	From floor to center of headlining	8 ft. $0\frac{5}{8}$ in.
Length of front platform	6 ft. 3 in.	Track to step	$17\frac{1}{8}$ in.
Length of rear platform	5 ft. 1 in.	Step to step	$11\frac{1}{2}$ in.
Length of baggage compartment	6 ft. 3 in.	Step to floor	$11\frac{1}{2}$ in.
Length of smoking compartment	11 ft. 0 in.	Seating capacity	54
Centers of side posts	2 ft. 8 in.	Type of trucks	Brill No. 27-M.C.B.1
Width over sills	8 ft. $2\frac{1}{2}$ in.	Wheel base	6 ft. 6 in.
Extreme width	8 ft. $5\frac{3}{4}$ in.	Diameter of wheels	34 in.
From track to side sills	3 ft. $6\frac{1}{2}$ in.	Type of motors	GE205

The principal dimensions of the baggage car are as follows:

Length of body over vestibules	43 ft. 8 in.	From floor to ceiling	8 ft. $0\frac{3}{4}$ in.
Length over bumpers	45 ft. 0 in.	Type of trucks	Brill No. 27-M.C.B.1
Width over sills	8 ft. 2 in.	Wheel base	6 ft. 6 in.
From track to side sills	3 ft. $6\frac{1}{2}$ in.	Diameter of wheels	34 in.
Side sills over trolley boards	9 ft. $2\frac{1}{8}$ in.	Type of motors	GE205

ADDITIONAL
"WASHINGTON" CENTER ENTRANCE CITY
AND INTERURBAN CARS

BRILL SEMI-CONVERTIBLE WINDOW SYSTEM

THE success of the original "Washington" Center Entrance car, designed by Mr. W. A. Wenner, master mechanic of the Washington Railway & Electric Company, is emphasized by thirty city and five suburban cars, embodying changes in the door and seating arrangements, that have recently been completed for that company by the J. G. Brill Company. The original car was fully described and illustrated in BRILL MAGAZINE for April, 1912.

The principal change is in the door arrangement, which, in the original car, included three door units, those on the outside for exit and that in the center for entrance. The decrease in the total width of the door opening in the new cars, by the use of an individual entrance and exit, while not increasing the seating capacity, has given a larger working space to the motorman and separates him from the passengers more effectively than in the original car, without resort to

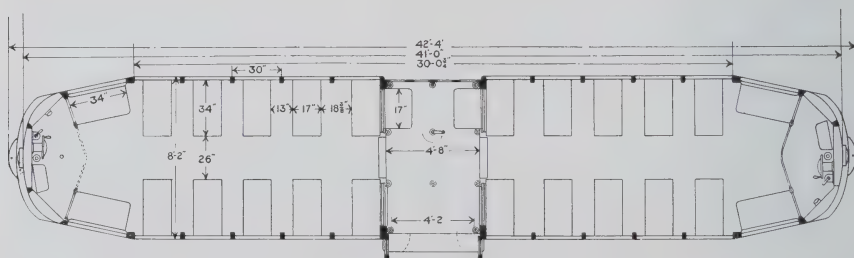


CARS FOR WASHINGTON. Suburban car. Bottom frame similar to city car, except 5 feet longer. Side sheathing, tongued and grooved poplar boards



CARS FOR WASHINGTON. Car for city service. Side sills in two lengths, from center entrance to bumpers. Steel sill plate runs entire length and drops under platforms where it is reinforced by 6-in. channel and extra steel plate; 6-in. I-beam stringers drop under platforms. Side panels covered with steel

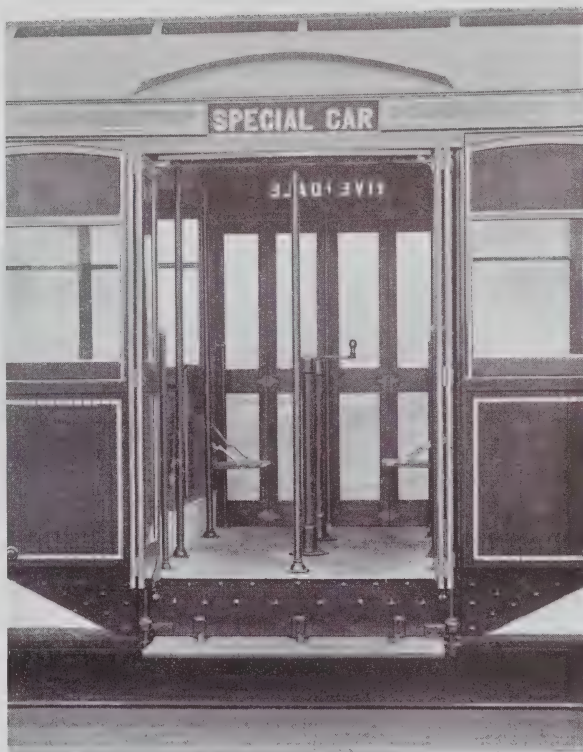
bulkheads. In the new cars he is separated from the passengers by a curved railing, which is dropped behind him, level with the seat backs, and that can be raised out of the way on pipe stanchions, making the end of the car available for standing passengers when running in the opposite direction. The conductor's position, as heretofore, is in the center, where there are two door-control stands, each operating the nearer set of two-leaf folding doors and synchroal folding steps, through a simple lever arrangement. The door opening is divided by a pipe stanchion that extends from the platform floor to the top rail over the door; this stanchion and two shorter pipes, placed next to the door posts, form convenient grabhandles for boarding and alighting. Four additional pipe stanchions, extending from the platform floor to the headlining, are placed



CARS FOR WASHINGTON. Total seating capacity, 50; 37 face forward; 5 backward; 8 inward. In suburban cars stationary cross seats are used instead of longitudinal corner seats with folding seats hinged to backs. Portable aisle seat encloses motorman's space. Door on motorman's right

where the aisles meet the platform, and, in addition to reinforcing the roof at those points, support standing passengers.

The seating arrangement is similar to that of the original car, as regards the general plan, but because of the larger space allotted the motorman and the use of a smaller platform, the plan adopted includes four reversible and one stationary cross seat, for ten passengers, placed on each side of both halves of the body. The backs of the two stationary seats are secured to mahogany panels that form the sides of the platform. Near the ends of the car, a longitudinal seat, for two passengers, discernible in the diagram



CARS FOR WASHINGTON. Two-leaf folding doors and synchronal folding steps manually controlled by conductor. Four one-passenger folding platform seats hinged to platform panels. No dividing railings

on page 54, is placed on each side, and the pipe railing, isolating the motorman, is level with the front panels of these seats. In addition, four folding mahogany seats, each for one passenger, are hinged to the platform panels, and may be folded up when the adjacent door opening is in use. By this plan seats are provided for 50 passengers, of whom 38 face forward, four

backward, and eight, the center aisles. The car windows are of the Brill semi-convertible type, in which the two sashes have a weatherproof hinged joint, and both disappear into roof pockets. Their unusually great height—3 ft. 7 in.—provides an abundance of light and air in summer, when the windows are open, and in winter, when they are closed. ample ventilation is afforded by a vacuum ventilating system. Mahogany, inlaid with narrow lines of white holly, is the

only wood used within the car, and this, with composition headlining, painted a cream color, creates an effective interior. Electric push buttons are among the accessories, and everything conducive to the convenience and comfort of the passengers has been provided.

The five suburban cars differ but slightly from the city cars; principally in being five feet longer and having a somewhat different



CARS FOR WASHINGTON. Suburban cars have vestibule door for motorman. Two folding seats for use at rear; portable cross seat bars motorman's space

seating arrangement. The general appearance of finish and fixtures is precisely as in the smaller cars and their method of operation is the same. In place of the two longitudinal



CARS FOR WASHINGTON. Brill semi-convertible window system. Conductor in center of car. Motorman separated from passengers by removable pipe railing. Seating capacity, 50. Suburban cars seat 55

vestibule seats for four passengers, as in the city cars, there are two stationary transverse seats, with their backs toward the ends; two folding mahogany seats are hinged to the backs of these, increasing the seating capacity by four; depending on the direction in which the car is moving, those at the rear end only are used. At the end occupied by the motorman, a rattan-covered seat is placed between the two stationary seats, serving the double purpose of a further seat for one passenger and a barrier to the motorman's space; the total seating capacity of the suburban cars is 55 passengers. Provision is made for an outwardly folding door on the right side of the motorman's space, for his use only, immediately forward of the folding seats; the city cars are not provided with motorman's doors.

The body framing of both cars consists of $2\frac{1}{4}$ -in. ash side

posts, $3\frac{3}{4}$ -in. corner and $3\frac{1}{2}$ -in. center door posts; these are secured to a $2\frac{1}{8}$ by $2\frac{3}{4}$ -in. yellow pine top rail. Because of the center entrance and the consequent lack of side framing at that point, a very heavy letter-board— $\frac{7}{8}$ by $11\frac{1}{2}$ -in.—extends the full length of the car. Below the belt rail, chestnut, sheathed with No. 16 steel, is used in the city cars, while the suburban cars have ash ribs between the posts, which are covered with tongued and grooved poplar board sheathing.

The bottom frames of both types of cars are practically alike, except for an increase of 5 ft. in length and the absence of convergence in the side sills near the ends, in those of the suburban cars, where they are joined to the Brill angle iron bumpers. Contrary to usual practice, the side sills consist of two distinct lengths of $3\frac{7}{8}$ by $7\frac{3}{4}$ -in. yellow pine, extending from the center door posts to the vestibule posts in the city car and the body corner posts in the suburban. They are reinforced with $\frac{3}{8}$ by 15-in. steel plates, which, however, drop at the center platform, and rising beyond it, continue along the wooden sills under the other half of the body. From a point about three feet beyond each center door post, a 6-in. channel and a $\frac{3}{8}$ by 10-in. steel plate reinforce the larger sill plate, thereby stiffening the sides of the center entrance. Two 3-in. I-beam center stringers run through from end to end, depressed under the center platform; they are securely bolted to $1\frac{3}{4}$ by 3 and $4\frac{1}{2}$ by $4\frac{1}{2}$ -in. oak crossings affixed to the steel sill plates with 3 by 3 by $\frac{3}{8}$ -in. angles. The body bolsters of the city cars are cast steel, and those of the suburban of the plate type, the bottom members being riveted to the I-beam center stringers. The five suburban cars are mounted on Brill No. 27-M.C.B1 trucks, with solid forged side frames, capable of a speed of 50 miles per hour.

The following dimensions, etc., apply to the city cars:

Length over bumpers . . .	41 ft. 8 in.	Width over posts	8 ft. $2\frac{3}{4}$ in.
Length of center platform .	4 ft. 8 in.	Extreme width	8 ft. $2\frac{3}{4}$ in.
Centers of side posts . . .	2 ft. 6 in.	From track to side sills . .	2 ft. $2\frac{3}{4}$ in.
Width over sills	8 ft. 2 in.	Rail over trolley boards . .	11 ft. 6 in.

From track to step	13 $\frac{1}{8}$ in.	Wt. of body less electrical	
Step to platform	12 in.	equipment	16,585 lb.
Platform to floor	10 in.	Wt. of electrical equipment	1,500 lb.
Seating capacity	50	Wt. of air-brake equipment	1,500 lb.
Type of motors . . . West. 306—4-50 hp.		Weight of motors	11,500 lb.

The following dimensions, etc., apply to the suburban cars:

Length over bumpers . . . 46 ft. 0 in.	Type of trucks . . . Brill No. 27-M.C.B.1
Length of center platform . 4 ft. 9 $\frac{1}{2}$ in.	Wheel base 6 ft. 0 in.
Centers of side posts . . . 2 ft. 7 $\frac{1}{2}$ in.	Diameter of wheels 32 in.
Width over sills 8 ft. 6 in.	Size of journals 3 $\frac{3}{4}$ by 7 in.
Width over posts 8 ft. 6 $\frac{3}{4}$ in.	Type of motors . . . West. 306—4-50 hp.
Extreme width 8 ft. 6 $\frac{3}{4}$ in.	Weight of car body less elec.
From track to side sills . . 2 ft. 5 $\frac{3}{8}$ in.	equipment 17,000 lb.
From rail over trolley boards, 11 ft. 10 $\frac{1}{2}$ in.	Weight of elec. equipment . . 1,500 lb.
From track to step 14 $\frac{3}{4}$ in.	Wt. of air-brake equipment . . 1,500 lb.
From step to platform . . . 13 in.	Weight of trucks 13,400 lb.
From platform to floor . . . 10 in.	Wt. of motors 11,500 lb.
Seating capacity 57	



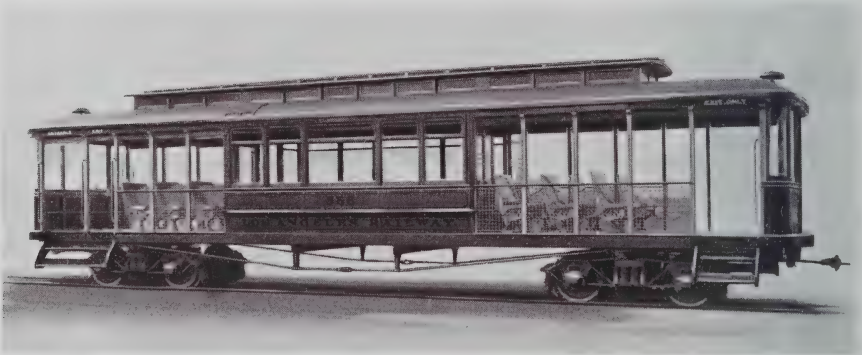
FIFTY "CALIFORNIA" CARS FOR LOS ANGELES

PREPAYMENT TYPE

THE fifty new "California" cars, recently shipped to the City Railway Company, Los Angeles, Cal., by the American Car Company, are generally similar to the type shown in the article on Los Angeles traffic conditions and standard cars published in the November, 1911, issue of BRILL MAGAZINE. The car was developed about twelve years ago and soon demonstrated its suitability to the climate and to the traffic requirements. The car is, today, substantially as originally planned, except that the platforms have been lengthened to adapt them to the prepayment method of fare collection.

The platforms are of the open vestibule type, 6 ft. 9 in.

long; the open sections at each end, 7 ft. 8 in. long, and the closed compartment, 14 ft. 7½ in. The open sections have six reversible cross seats each, accommodating 24 passengers; the closed section has longitudinal seats with capacity for 24 passengers, or 48 passengers for the car. Two-inch side posts, 28½ in. between centers, are used in the closed section, except at the middle window, which is double the width of the others. All sashes in the body, except the deck sashes, are stationary. The two body bulkheads have each a single sliding door and two windows protected by brass window rods. In the open sections, 2½ in. posts, measuring 30⅔ in. between centers, are used. The sides, at the open sections, are protected with hinged wire-mesh screens and the curtains are made to be drawn down to the floor. Being arranged for double-end operation, the two platforms are alike; at the controller side the opening is 5 ft. 6 in., and so divided by a side post as to give an entrance 40½ in. wide and exit 33 in. wide; no railings are used for separating boarding and alighting passengers. Double steps are used because of flush platforms, which allow the 5 ft. 3-in. wheel base trucks to traverse 45 ft. radius curves. The interior finish in both the open and closed sections, including the headlining, is in natural mahogany, and lends the cars a rich appearance.



CARS FOR LOS ANGELES. New standard type of the Los Angeles lines with prepayment platforms. Cars and trucks built by American Car Company



CARS FOR LOS ANGELES. Stationary sashes in closed section. Longitudinal seats in closed section, 24; reversible seats, open sections, 24; total, 48

The cars are built on composite bottom frames that have 5 by 7-in. pine side sills, plated on the outside with $\frac{1}{2}$ by 7-in. steel; four 5-in. I-beam stringers, reinforced with oak fillers, running through from end to end, the two outer ones being $2\frac{1}{4}$ in. from the side sills, and the other two each 12 in. from the longitudinal center line of the car. There are $3\frac{3}{4}$ by $3\frac{3}{4}$ -in. oak cross joists between the stringers, reinforced by $\frac{5}{8}$ -in. tie rods and $2\frac{1}{4}$ by 3 by 5-in. wood spacers between the outer stringers and the side sills; there are no end sills, as all the stringers run through from end to end and are bolted to a $21\frac{3}{8}$ by $2\frac{5}{8}$ -in. oak crown piece, the bumper end of which is faced with $\frac{3}{8}$ by 6-in. steel plate. Under trusses of 1-in. rods with $1\frac{1}{4}$ -in. turnbuckles reinforce the side sills in maintaining horizontal alignment. The trucks are of a special arch-bar type devised by the railway company, and were built by the American Car Company.

Length over corner posts	29 ft. 11½ in.	Width over sills	7 ft. 10 in.
Length over platforms	43 ft. 6½ in.	From track to side sills	2 ft. 7 ³ / ₁₆ in.
Length of platforms	6 ft. 9½ in.	From side sills over trolley boards	9 ft. 3½ in.
Centers of side posts, open compartment	2 ft. 6¾ in.	From floor to center of headlining	8 ft. 3 in.
Centers of side posts, closed compartment	2 ft. 4½ in.	Track to step	15 in.
Width over posts, open comp.	7 ft. 9 in.	Step to step	12 in.
Width over posts, closed compartment	8 ft. 2 in.	Step to platform	12 in.
		Seating capacity	48



NEW CARS FOR LAUREL, MISS.

BRILL SINGLE-MOTOR TRUCKS

THE Laurel Light & Railway Company, for which the American Car Company lately built four double-truck closed cars, operates the street railway and furnishes power for industrial purposes in Laurel, Miss. The city, which is a county-seat and the commercial center of a large district, is situated in the southeastern part of the state. The



CARS FOR LAUREL, MISS. Platforms have two-leaf folding doors on both sides. Steps normally down, but fold up when not in use. Wood bottom-frame. Brill No. 39-E single motor trucks



CARS FOR LAUREL, MISS. Mutually operated sliding bulkhead doors. Transverse seats for 24 persons; longitudinal seats, 8; total, 32. Lower sashes raise, upper stationary

section of Mississippi in which it is located is noted for the richness of its soil and for its great agricultural activity. It is an important railroad center, and is in direct connection with the entire country via the New Orleans & Northeastern, New Orleans, Mobile & Chicago, and the Gulf & Ship Island Railroads.

The four cars are arranged for double-end operation. They have vestibuled platforms that are equipped with two-leaf folding doors on both sides. The steps are arranged to be folded in a simple and efficient manner, like in usual open summer cars, as may be seen in the accompanying engraving. The car body being comparatively short—24 ft.—the platform door arrangement, in which each door may be locked, is equally well adapted to one- or two-man operation. This is especially desirable in smaller cities, where traffic is very

light during some hours of the day and often insufficient to justify full-crew operation at night. Operating flexibility of this nature not only tends toward economy in daytime, but may justify the maintenance of a light all-night service.

The bulkheads have the sashes and mutually-operated sliding doors that are usually found in cars of the less radical designs. Seating capacity is provided for 32 passengers on 12 reversible transverse seats and longitudinal seats in the corners. The use of the Brill plain-arch roof, with composition headlining painted a light color, adds much to the efficiency of ventilation and light. The windows are of the arch-top variety and have double sashes, in which the upper are stationary and the lower are made to raise their full height. Push buttons for signaling the motorman, and which are especially desirable for one-man operation, are placed in the side posts.

The bottom frames are of wood. The side sills are of southern, straight-grained yellow pine, $4\frac{3}{4}$ by $7\frac{3}{4}$ -in., and are reinforced with $\frac{3}{8}$ by 12-in. steel plates. The end sills are of oak, $4\frac{3}{4}$ by $7\frac{3}{4}$ in., and oak cross joists, $3\frac{1}{2}$ by $6\frac{1}{8}$ in., are used for lateral bracing. The cars are mounted on Brill No. 39-E single-motor trucks, which are capable of a speed of 30 miles an hour and allow a considerable lowering of the car body owing to the short radius of curvature of the drivers and the small diameter of the pony wheels, making it unnecessary for drivers to pass under the side sills in traversing the sharpest curves.

The principal dimensions are as follows:

Length over corner posts	24 ft. 0 in.	Step to platform	13½ in.
Length over platforms	34 ft. 0 in.	Platform to floor	9¾ in.
Length of platforms	5 ft. 0 in.	From floor to center of	
Centers of side posts	2 ft. 11 in.	headlining	7 ft. 11⅛ in.
Width over sills	8 ft. 0 in.	Seating capacity	32
Width over posts	8 ft. 6 in.	Type of trucks	Brill No. 39-E
From track to side sills	2 ft. 8 in.	Wheel base	4 ft. 6 in.
From side sills over trolley		Diameter of wheels	33 and 21 in.
boards	9 ft. 1¼ in.	Type of motors	GES0-2-40 hp.
Track to step	16½ in.		

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